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## Document Information

**Location:** Powertrain / High Voltage

**Topic:** McLaren P1 GEN 2 Battery Software and Charging Limitations

**Condition:** Temporary

**Diagnostic Trouble Codes:** N/A

## Measure

The release of BMS software 12JA369CP.04 will introduce a further enhancement to protect the GEN 2 battery from entering a state of unrecoverable deep discharge. There are some limitations involved with the new software for the charging procedure and how to recover a GEN 2 battery that enters a deep discharge state. Please carefully read the following points and make sure you fully understand them before proceeding with the BMS software uplift to 12JA369CP.04.

## Charging Limitations

The charging procedure set out on the previous release of this information has not changed and must be adhered to prevent the P1 GEN 2 battery from entering a state of deep discharge. Please see charging requirements listed further down this document.

Recovering from deep discharge (< 3 Volts - min. brick voltage) with Outboard Charger (OBC)

- The battery can be charged with the OBC from any ignition status (IS) below IS5 if the OBC is connected within 60 seconds of waking the vehicle
- The battery cannot be charged with the OBC in IS5

Recovering from deep discharge status with the internal combustion engine (ICE)

- The GEN 2 battery cannot be charged with the ICE under any circumstances to recover from deep discharge

**Care Point:** Opening of the contactors in deep discharge to protect the GEN 2 battery. When the minimum brick voltage goes below 3 volts, the contactors do not open if IS5 is maintained.

This is to eliminate opening the contactors in a normal driving situation.

After an ignition cycle, the contactors will open after 60 seconds of returning to IS5 if the minimum brick voltage is still below 3 volts.

## Important Vehicle Charging Requirements

### Customer Information

Following the installation of any McLaren P1 GEN 2 battery, it is imperative that the following

requirements are shared with and understood by the customer or person responsible for the vehicle.

### Checking Suitability and Operation

The McLaren P1 battery charger must be correct for the Region and not plugged in using any extension cable.

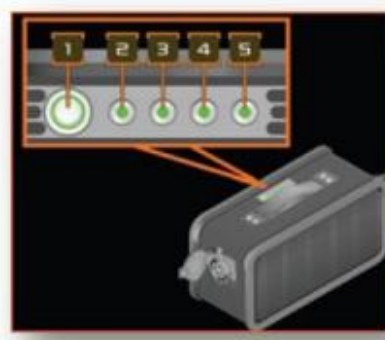
Following connection of the battery charger and pressing the start button, green LEDs must be displayed across all 5 lights on the battery charger display.

Please refer to the below table and information regarding McLaren P1 HV battery charger operation should the LED operation not be as expected:

The following table shows the expected LED status and colour when the charger is operating correctly and all pre-conditions are met.						
	Charger Status	Cable and Connector Status	12V Battery Status	Vehicle Status	HV Battery Status	User Action Required / Explanation
Charger Initializing	Pulsing Green	Off	Off	Off	Off	Charger will need some time to complete initialization checks. In extremely hot ambient the charger may need additional time to cool itself prior to charging.
Charger Disconnected	Solid Green	Flashing Amber	Off	Off	Off	Check the charge connector is fully inserted to the vehicle.
12V Battery Voltage Recovery	Solid Green	Solid Green	Pulsing Green	Off	Off	12V voltage is being recovered. No HV charging (HV charging will commence once 12V battery voltage has been recovered).
Check Vehicle	Solid Green	Solid Green	Pulsing / Solid Green <sup>1</sup>	Flashing Amber	Off	Apply parking brake and/or switch vehicle ignition off.
HV Battery Charging	Solid Green	Solid Green	Pulsing / Solid Green <sup>1</sup>	Solid Green	Pulsing Green	12V battery voltage recovery is complete and HV battery is being charged.
Standby HV Battery Charged	Solid Green	Solid Green	Pulsing / Solid Green <sup>1</sup>	Solid Green	Solid Green	HV charging completed.
Sleep HV Battery Charged	Solid Green	Solid Green	Pulsing / Solid Green <sup>1</sup>	Solid Green	Solid Green	Charger put to sleep by the vehicle to save energy once charging is complete.

<sup>1</sup> Pulsing/Solid Green on the 12V battery status means that the LED will pulse if the 12V battery is not yet charged. When the 12V battery is charged, the LED will be illuminated solid green. Contact your McLaren Retailer if a fault is indicated on the charger by a red LED.

LED Colour	Meaning
None (LED off)	Not powered
Solid green	OK / complete
Pulsing green	In progress
Flashing amber	User action required
Flashing red	Fault detected



### Charging Requirements

Please ensure the following instructions are strictly adhered to:

1. Initiate charging and charge the vehicle for a maximum period of 2.5 hours while the vehicle is not in drive state
2. Check and ensure the battery charger LEDs indicate correct operation during charging
3. After 2.5 hours has elapsed, disconnect the P1 HV battery charger
4. Lock the vehicle with the key then allow for the vehicle to sleep for 10 minutes
5. Switch on the vehicle ignition and ensure the HV battery has reached  $\geq 80\%$  state of charge

6. The vehicle should be rechecked at regular intervals to ensure the HV battery state of charge has been maintained and should be recharged as required

**Care Point:** If the HV battery state of charge is found not to have reached  $\geq 80\%$  following a 2.5 hour charging period the customer must contact their Retailer immediately so a Technical Request can be submitted for further guidance

**Care Point:** The McLaren P1 HV battery charger must not be connected to the vehicle for longer than 2.5 hours at a time

**Care Point:** The HV battery must be fully recharged at an interval of no more than 60 days

**Care Point:** If the charger LEDs indicate correct operation, it is still imperative to check battery state of charge has reached 100% following charging

**Care Point:** If any further issues are experienced during this process, please raise a Technical Request for further guidance

The above measures are a temporary solution to ensure all newly installed McLaren P1 GEN 2 HV batteries are not subject to discharge and potential damage. A software solution is being worked on and further details will be provided as soon as possible.

## Parts Information

N/A

## Attachments

N/A

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